

WHAT IS CLAIMED IS:

- 1 1. A method comprising:
2 cloning information stored in a first unit of storage in a second unit of storage,
3 wherein
4 said first unit of storage is stored in a first cache maintained by an
5 upper-level system, and
6 said second unit of storage is stored in a second cache.

- 1 2. The method of claim 1, wherein
2 a single cache comprises said first and said second caches.

- 1 3. The method of claim 1, wherein said cloning comprises:
2 copying said information from said first unit of storage to said second unit of
3 storage.

- 1 4. The method of claim 3, further comprising:
2 partially writing a unit of storage of a storage unit by writing a portion of said
3 information from said second unit of storage to said unit of storage of
4 said storage unit; and
5 partially writing said unit of storage of said storage unit by writing new
6 information to said unit of storage of said storage unit.

- 1 5. The method of claim 3, wherein said copying comprises:
2 reading said information from said first unit of storage; and
3 writing said information to said second unit of storage.

- 1 6. The method of claim 5, further comprising:
2 writing to said unit of storage after said reading.

- 1 7. The method of claim 5, further comprising:
2 reading said information from said second unit of storage; and
3 calculating parity information using said information.

1 8. The method of claim 1, wherein further comprising:
2 determining if said first unit of storage is to be modified; and
3 performing said cloning if said first unit of storage is to be modified.

1 9. The method of claim 8, wherein said cloning comprises:
2 said first unit of storage is to be modified if said first unit of storage is to be
3 written to.

1 10. The method of claim 8, further comprising:
2 reading said information from said second unit of storage; and
3 calculating parity information using said information.

1 11. The method of claim 8, further comprising:
2 modifying said first unit of storage after said performing said cloning.

1 12. The method of claim 11, wherein said modifying comprises:
2 writing to said first unit of storage.

1 13. The method of claim 1, wherein said cloning comprises:
2 determining if said information will be needed in the future; and
3 performing said cloning if said information will be needed in the future.

1 14. A storage system comprising:
2 an old data cache.

1 15. The storage system of claim 14, further comprising:
2 an upper-level system, communicatively coupled to said old data cache; and
3 a lower-level storage module, communicatively coupled to said old data cache
4 and said upper-level system.

1 16. The storage system of claim 15, wherein
2 said lower-level storage module is a volume manager.

1 17. The storage system of claim 16, wherein said lower-level storage
2 module comprises a cache.

1 18. The storage system of claim 17, wherein
2 said lower-level storage module is configured to clone information from a
3 page in said cache to a page in said old data cache.

1 19. The storage system of claim 18, wherein
2 said upper-level system is configured to access said page in said old data
3 cache.

1 20. The storage system of claim 15, wherein said upper-level system
2 comprises a cache.

1 21. The storage system of claim 20, wherein
2 said upper-level system is configured to clone information from a page in said
3 cache to a page in said old data cache.

1 22. The storage system of claim 21, wherein
2 said lower-level storage module is configured to access said page in said old
3 data cache.

1 23. The storage system of claim 20, wherein
2 said upper-level system is one of a filesystem, a database and a hardware
3 RAID controller.

1 24. The storage system of claim 15, further comprising:
2 storage unit, wherein
3 said lower-level storage module is coupled to control said storage unit.

1 25. The storage system of claim 24, further comprising:
2 a parity cache, wherein
3 said storage unit is a RAID, and

4 said parity cache is configured to store parity information corresponding to
5 data read from said RAID.

1 26. The storage system of claim 24, wherein
2 said storage unit comprises a source volume and a snapshot volume, and
3 said lower-level storage module is configured to write information from a
4 page in said old data cache to said snapshot volume.

1 27. An apparatus comprising:
2 an upper-level system comprising a first cache;
3 a second cache; and
4 means for cloning information stored in a first unit of storage in a second unit
5 of storage, wherein
6 said first unit of storage is stored in said first cache, and
7 said second unit of storage is stored in said second cache.

1 28. The apparatus of claim 27, wherein
2 said means for cloning comprises
3 means for copying said information from said first unit of storage to
4 said second unit of storage; and
5 said apparatus further comprises
6 means for partially writing a unit of storage of a storage unit
7 comprising means for writing a portion of said information
8 from said second unit of storage to said unit of storage of said
9 storage unit, and
10 means for partially writing said unit of storage of said storage unit
11 comprising means for writing new information to said unit of
12 storage of said storage unit.

1 29. The apparatus of claim 27, wherein
2 said means for cloning comprises
3 means for reading said information from said first unit of storage, and
4 means for writing said information to said second unit of storage; and
5 said apparatus further comprises

6 means for writing to said unit of storage, operable to write to said unit
7 of storage after an operation of said means for reading.

1 30. A storage system comprising:
2 a processor;
3 computer readable medium coupled to said processor; and
4 computer code, encoded in said computer readable medium, configured to
5 cause said processor to:
6 clone information stored in a first unit of storage in a second unit of
7 storage, wherein
8 said first unit of storage is stored in a first cache maintained by
9 an upper-level system, and
10 said second unit of storage is stored in a second cache.

1 31. The storage system of claim 30, wherein
2 said computer code configured to cause said processor to clone said
3 information is further configured to cause said processor to copy said
4 information from said first unit of storage to said second unit of
5 storage; and
6 said computer code is further configured to cause said processor to
7 partially write a unit of storage of a storage unit by virtue of being
8 configured to write a portion of said information from said
9 second unit of storage to said unit of storage of said storage
10 unit, and
11 partially write said unit of storage of said storage unit by virtue of
12 being configured to write new information to said unit of
13 storage of said storage unit.

1 32. The storage system of claim 30, wherein
2 said computer code configured to cause said processor to
3 read said information from said first unit of storage, and
4 write said information to said second unit of storage; and
5 said computer code is further configured to cause said processor to
6 write to said unit of storage after said reading.

1 33. A computer program product comprising:
2 a first set of instructions, executable on a computer system, configured to
3 clone information stored in a first unit of storage in a second unit of
4 storage, wherein
5 said first unit of storage is stored in a first cache maintained by an
6 upper-level system, and
7 said second unit of storage is stored in a second cache; and
8 computer readable media, wherein said computer program product is encoded
9 in said computer readable media.

1 34. The computer program product of claim 33,
2 wherein said first set of instructions comprises
3 a first subset of instructions, executable on said computer system,
4 configured to clone said information is further configured to
5 cause said processor to copy said information from said first
6 unit of storage to said second unit of storage; and
7 further comprising
8 a second set of instructions, executable on said computer system,
9 configured to partially write a unit of storage of a storage unit
10 by virtue of being further configured to cause said processor to
11 write a portion of said information from said second unit of
12 storage to said unit of storage of said storage unit, and
13 a third set of instructions, executable on said computer system,
14 configured to partially write said unit of storage of said storage
15 unit by virtue of being further configured to cause said
16 processor to write new information to said unit of storage of
17 said storage unit.

1 35. The computer program product of claim 33,
2 wherein said first set of instructions comprises
3 a first subset of instructions, executable on said computer system,
4 configured to read said information from said first unit of
5 storage, and
6 a second subset of instructions, executable on said computer system,
7 configured to write said information to said second unit of
8 storage; and
9 further comprising
10 a second set of instructions, executable on said computer system,
11 configured to write to said unit of storage after said reading.